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New Guidelines for Oilfield Water Disposal Well Testing - Initial Application and Annual Monitoring

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The British Columbia Oil and Gas Research and Innovation Society (BCOGRIS) commissioned a review of water disposal well testing practices in 2024. Demand for water disposal services in oilfield operations in Western Canada is strong despite increased water recycling in horizontal well hydraulic fracturing operations.

The application for, and ongoing monitoring of, water disposal well schemes require initial testing to set injection pressure limits, and periodic measurement of reservoir pressure to ensure containment. The goals are simple:

1. Limit injection rate and pressure to avoid hydraulic fracturing of the disposal zone, and
2. Monitor reservoir pressure to know when the disposal zone storage capacity has been reached.

However, in our review of testing practices, we identified issues with both the initial testing and monitoring submissions.

Testing Issues include:

- Well testing practices that do not prepare for wellhead pressure dropping below zero-gauge pressure (vacuum).
- Misinterpretation or mislabeling of tests intended to be Diagnostic Fracture Injection Tests (DFITs),
- Very high injection pressure gradient (pressure / depth) on Step-Rate-Tests that may grossly exceed the lithostatic pressure,
- Pressure monitoring tests that do not identify changes in behavior, such as hydraulic fracturing,
- The application of complex modeling including heterogeneous permeability and constant-pressure boundaries to suggest a maintained lower average reservoir pressure.

Failure to properly measure and monitor key pressures in disposal schemes adds risk to future drilling near these sites and may cause reservoir and wellbore containment failures that lead to environmental damage. Cases of these types of failures are being reported in parts of the US with a high level of oilfield water disposal activity.

A new **Guideline** for disposal well initial and ongoing testing was issued in Dec 2025 that addresses these issues. The Guideline, which includes recommended testing practices, analysis techniques, and example cases, is available on the BCOGRIS website. Step-Rate-Testing is recommended as a replacement for DFIT's to set Maximum Wellhead Injection Pressure (MWHIP) and injection fall-off Pressure Transient Analysis (PTA) diagnostic techniques are recommended for both initial and on-going monitoring tests.

In this presentation some case studies will be shown to highlight both historical testing failures and proposed new techniques in the Guideline.

Acknowledgements

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References

https://www.bcogris.ca/projects/disposal-and-injection-well-testing-and-analysis-guideline-update/